

FIG. 1

Model name	Handling procedure	Action
HA-8160	SR0302	A011
HA-8160	SR0302	A239
HA-8160	SR0302	A021
HA-8160	SR0302	A012
HA-8160	SR0201	A031

FIG. 2A

Model name	Action	Hour	Price of parts	Hyper link
HA-8160	A011	8	1600	a011.htm
HA-8160	A239	3	0	a239.htm
HA-8160	A021	5	0	a021.htm
HA-8160	A012	20	0	a012.htm

FIG. 2B

Report No.	Model name	Equipment ID	Work data	Symptom	Diagnostic material	Cause	Handling procedure
123456	HA-8160	654321	2002/3/26	T11	J05	R03	SR0301
123455	GA-1160	354320	2002/3/23	E03	J01	R05	SR0503
123453	HA-8160	654321	2002/3/20	T13	J03	R11	SR1101
123452	HA-8160	654321	2002/3/12	T11	J02	R03	SR0302

FIG. 2C

Model name	Handling procedure	Cause-based MTBF	MTBF	Number of samples	Number of days	Completion report	MTTR	Cost
HA-8160	SR0211	386	33	198	124	123121	48	56,000
GA-1160	SR0302	193	23	123	53	123211	36	25,000
HA-8160	SR0502	123	32	112	46	112321	38	32,000
HA-8160	SR0402	0	0	19	1	121239	64	98,000

FIG. 2D

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 Docket No.: 10873.1594USWO
 Title: TROUBLE COUNTERMEASURE SUPPORT SYSTEM AND TERMINAL DEVICE
 CONNECTED TO THE SAME
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FIG. 3A

Model name	Symptom	Diagnostic material	Cause
HA-8160	T11	J23	R01
HA-8160	T11	J02	R02
HA-8160	T11	J12	R03

FIG. 3B

Model name	Cause	Handling procedure
HA-8160	R02	SR0302
HA-8160	R02	SR0201
HA-8160	R02	SR0408
HA-8160	R02	SR0409
HA-8160	R03	SR0502

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Address (D) Y:\HandlingUnifiedManual\AdamsTop.htm Go

ADAMS Series

Trouble shooter of ADAMS Series handles the following models

- HA-8160
- HA-8150
- GA-1160
- GA-1150

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FIG. 4

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Address(D) http://172.26.1.40/arkray/carelab/ha-8160/4frame4-3-7_1.htm Go

Trouble shooter for HA-8160

What kind of problems ?
(Causes of failures are diagnosed here by symptoms)

- Problems about data
 - Value is high
 - Value is low
 - Value varies
 - R Time is fast or slow
 - R Time varies
 -
- Warning message of equipment is displayed
 - E01 Power down
 - E02 Printer error
 - E03 Rack full
 - E04 Can't washing
 - T01 flash memory
 - T02 COMM PMC1
 - T10 High pressure
 - T11 Low flowrate
 - T03 A/D error

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Intranet

FIG. 5

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T11 Low flowrate

(Occurrence conditions)

- Pressure of high pressure piping system is lower than 8 kg/cm²
- Pressure drop of high pressure piping system is greater than 70kg/cm²
- Detected only during measurement

Confirmation items

- No.1 J23:Liquid leak from injection valve
- No.2 J02:Bubbles are being generated in flow channel of A liquid
- No.3 J12:Liquid leak at liquid pumping unit
- No.4 J01:Contamination of flow channel of B liquid
- No.5 J09:Liquid leak of priming waste liquid line
- No.6 J04:Concurrence with T18 Drain over B
- No.7 J24:Unusual sound from manifold electromagnetic valve
- No.8 J05:Concurrence with T41 Dilution leak
- No.9 J17:Attachment portion of sampling loop is loose

FIG. 6

(R03) Cause

Path (T11-J02)

Connection between eluant tube and rear panel ⇒ Bad connection

Handling procedure Change to order of MTBF Change to order of Cost
(order of MTTR)

	MTTR:36(min) MTBF:193(day) Price of parts:¥1,600 Technical fee:¥25,000
<u>No.1</u> (SR0302)	<p>1. [A011] Replacing seal (8min) 2. [A239] Retightening connection between eluant tube and rear panel (3min) 3. [A021] Confirming piping pressure (5min) 4. [A012] Confirming measurement operation (20min)</p>
<u>No.2</u> (SR0301)	<p>MTTR:61(min) MTBF:348(day) Price of parts:¥11,200 Technical fee:¥25,000</p> <p>1. [A011] Replacing seal (8min) 2. [A239] Retightening connection between eluant tube and rear panel (3min) 3. [A032] Replacing piping from high pressure valve to damper (15min) 4. [A024] Replacing manifold (10min) 5. [A021] Confirming piping pressure (5min) 6. [A012] Confirming measurement operation (20min)</p>
<u>No.3</u> (SR0303)	<p>MTTR:95(min) MTBF:???(day) Price of parts:¥68,800 Technical fee:¥25,000</p> <p>1. [A011] Replacing seal (8min) 2. [A239] Retightening connection between eluant tube and rear panel (3min) 3. [A032] Replacing piping from high pressure valve to damper (15min) 4. [A024] Replacing manifold (10min) 5. [A043] Washing nozzle filter of each bottle (18min) 6. [A130] Retightening screws of each piping tube (6min) 7. [A258] Plugging and unplugging connector of pressure testing board (5min) 8. [A008] Replacing plunger seal (5min) 9. [A021] Confirming piping pressure (5min) 10. [A012] Confirming measurement operation (20min)</p>

FIG. 7

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(SR0302) Work procedure

Path (T11-J02-SR0302)

MTTR:36(min) MTBF:193(day) Price of parts:¥1,600 Technical fee:¥25,000

1. [A011] Replacing seal (8min)
2. [A239] Retightening connection between eluant tube and rear panel (3min)
3. [A021] Confirming piping pressure (5min)
4. [A012] Confirming measurement operation (20min)

FIG. 8

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Address(D) http://172.26.1.40/arkray/carelab/ha-8160/4frame4-3-7_1.htm Go

4 Maintenance index

4-1 Outline of maintenance

4-2 Daily maintenance

4-2 Replacement of consumables

4-3-1 Replace eluents 60A, 60B, 60C

4-3-2 Replace taky blood washing solution 60H

4-3-3 Replace thermal recording paper

4-3-4 Replace light source lamp

4-3-5 Replace thermal recording paper

4-3-6 Replace light source lamp

4-3-7 Replace thermal recording paper

4-3-8 Replace light source lamp

4-3-9 Replace thermal recording paper

4-3-10 Replace light source lamp

[A011] Replacing seal (8min)

Replace seal 60 of manifold

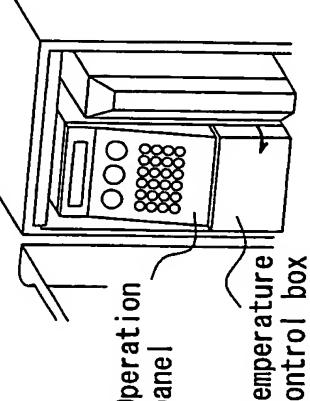
The seal 60 attached inside the manifold is a membrane to remove bubbles in the eluant. When the seal becomes contaminated, the pump flow rate becomes varied. This causes errors or troubles to occur. Please replace this seal once every 3 months or when 3000 measurements are exceeded after the previous replacement.

Items to prepare Seal 60 (product code: 10639), tweezers, crosshead screwdriver, spanner (double open end) 6-8

1 Open the temperature control box

- Confirm [Standby screen] is displayed.
- Open the front panel.
- Move the operation panel to the right as you face it.
- Open the temperature control box.

• At this time, a message "Cover Open (Can't start)" to warn that the temperature control box is open is displayed, but is automatically removed when the cover is closed after work ends.



Standby WHOLE 0001 Counter F.050 G.0050

Operation panel

Temperature control box

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Repair report

800391949

Completed

A) Business trip B) Take home

Receipt number:	999999996
Customer code:	888888
Customer name:	xxx Hospital
Tel:	075-xxx-xxx
Station code:	1234
Station:	Kyoto SS
Handling personnel code:	888
Handling personnel:	△△△△
Product name:	Adams A1C
Product code:	HA-8160
Equipment ID:	HA8160109999
ROM Ver:	1.08

Receipt date 2001/11/20

Delivery date 20011029

Work date 2001/11/20

Work time 13:30 ~ 14:15

Path input:	T11 <input type="button" value="▼"/>	J02 <input type="button" value="▼"/>	SR0302 <input type="button" value="▼"/>	New creation
Main symptom:	T11:flowrate Bubbles are being generated in flow channel of A liquid			
Main cause:	Eluant tube, Connecting portion of rear panel ⇒ Bad connection			
Content of treatment:	· Replacing seal · Retightening connection between eluant tube and rear panel			

FIG. 10

Repair report

800391949

Completed

A) Business trip B) Take home

Receipt number:	999999996
Customer code:	888888
Customer name:	xxx Hospital
Tel:	075-xxx-xxx
Station code:	1234
Station:	Kyoto SS
Handling personnel code:	888
Handling personnel:	△△△△
Product name:	Adams A1C
Product code:	HA-8160
Equipment ID:	HA8160109999
ROM Ver:	1.08

Receipt date

Delivery date

Work date

Work time ~

Path input:	<input type="text" value="T11"/> <input type="button" value="▼"/>	<input type="text" value="T11"/> <input type="button" value="▼"/>	<input type="text" value="T11"/> <input type="button" value="▼"/>	<input type="button" value="New creation"/> 
Main symptom:	T11:flowrate			
Main cause:				
Content of treatment:				

FIG. 11

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Symptom:T11:flowrate

Determine cause

Select cause location

Unit:

Flow channel system	▼
Nozzle	
Sampler	
Optical system	
Reaction unit	
Drive unit	

Next

FIG. 12

Symptom:T11:flowrate

Determine cause

Select cause location

Unit:Flow channel system

Set-screw	>	Eluant tube
Sample loop		Connecting portion
Pinch valve		of rear panel
Pre-filter	<	
Pre-filter holder		
Guide		

Back

Next

FIG. 13

Symptom: T11:flowrate
Determine cause
Cause location: Eluant tube, Connecting portion of rear panel
Select cause (stress)

Bad connection	▼
Wear	
Deformation	
Grease loss	
Disconnection	
Short circuit	
Slip off	

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FIG. 14

Symptom: T11:flowrate
Determine cause
Cause: Eluant tube, Connecting portion of rear panel ⇒ Bad connection
Fill in diagnostic criteria
Existing diagnostic criteria

No. 1 J23:Liquid leak from injection valve
No. 2 J12:Liquid leak at liquid pumping unit
No. 3 J01:Contamination of flow channel of B liquid
No. 4 J09:Liquid leak of priming waste liquid line
No. 5 J04:Concurrence with T18 Drain over B
No. 6 J24:Unusual sound from manifold electromagnetic valve
No. 7 J05:Concurrence with T41 Dilution leak
No. 8 J17:Attachment portion of sampling loop is loose

Input column for diagnostic criteria to determine cause
A Bubbles are being generated in flow channel of A liquid

FIG. 15

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Symptom:T11:flowrate

Cause:Eluant tube, Connecting portion of rear panel \Rightarrow Bad connection

Diagnostic criteria:Bubbles are being generated in flow channel of A liquid

Prepare work procedure

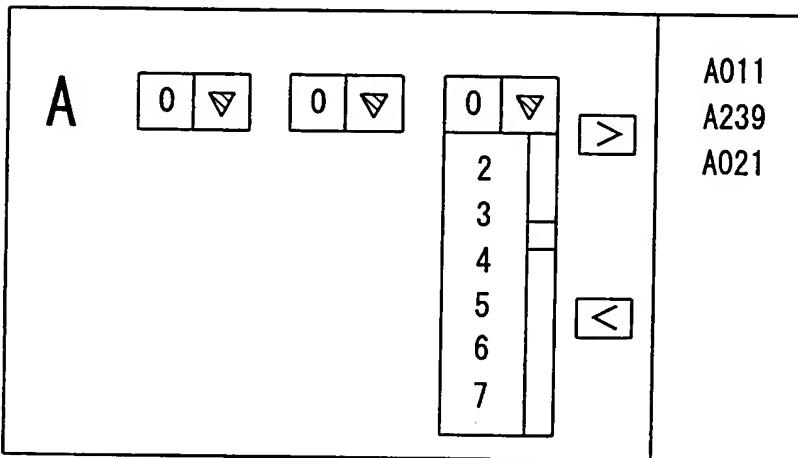


FIG. 16

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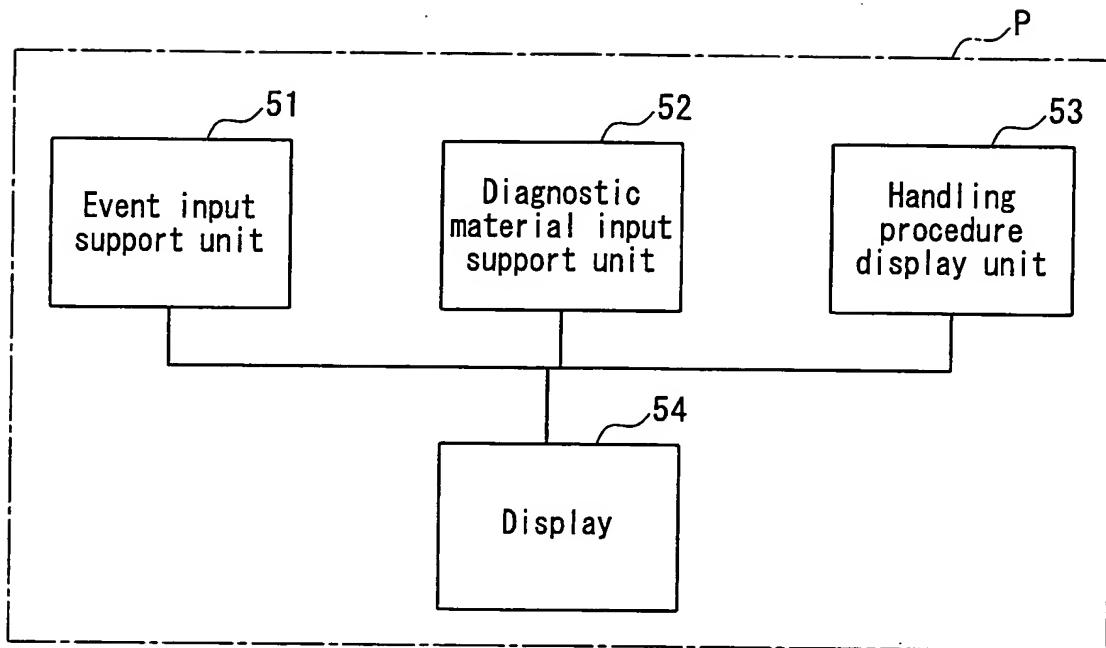


FIG. 17